

Preface

This book was written during the summer of 2003 as the text to accompany a series of three 70-minute lectures I was to give in the new Frontiers of Science course, to be required for all Columbia freshmen. It starts with discussion of the fate and climatic consequences of the CO₂ produced by burning fossil fuels and goes on to make the case that we are likely on a path toward tripled atmospheric CO₂ content. Opponents to action designed to stem this buildup refuse to accept predictions of impacts based on computer simulations and choose to attribute the current warming to natural causes. I put aside this issue and focus on the lessons offered to us by past climate changes.

In the middle sections of the book, I make a case that variations in solar irradiance, seasonality changes related to orbital cycles and reorganizations in ocean circulation have driven large changes in climate. Yet, when these forcings are introduced into climate models used to predict the impacts of extra CO₂, none produce impacts anywhere near as large as those observed in the climate record. The failure to reproduce these changes tells us that important amplifiers and teleconnections must be missing in these simulations. The bottom line is that, as our climate has proven itself to be an angry beast, it would be highly imprudent to poke it with tripled CO₂.

The last section of the book presents a plea that we pull out all the stops and create a means by which the flow of CO₂ into the atmosphere might be brought to a halt. In my estimation, only one sure route currently exists by which this might be accomplished. It involves the capture, liquefaction and storage of CO₂. As only about one third of the CO₂ is currently generated in large power plants, as part of this backstop, direct extraction from the atmosphere would have to be implemented. I say 'pull out all the stops' because stemming the buildup of CO₂ in the atmosphere will require at least 60 years, 20 or more to develop the required technologies, payment schemes and international agreements, and 40 or more to implement them worldwide.

My hope is that this book will find use in educating politicians and policy makers.

I am grateful to Patty Catanzaro who created the figures for the book (and for the power point presentation to the class) and to Joan Totton who shepherded the manuscript through its many iterations. Without the encouragement of Jeff Sachs who heads Columbia's Earth Institute, I doubt whether this project would have gotten off the ground.

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Patty Catanzaro • pcat@ldeo.columbia.edu • ph: 845-365-8515 • fax:845-365-8155

FOSSIL FUEL CO₂ AND THE ANGRY CLIMATE BEAST
by
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